Description
The mXT1067TD-Ax (SPI) 1.0 uses a unique charge-transfer acquisition engine to implement Microchip's patented capacitive sensing method. Coupled with a state-of-the-art CPU, the entire touchscreen sensing solution can measure, classify and track a number of individual finger touches with a high degree of accuracy in the shortest response time. The mXT1067TD-Ax (SPI) 1.0 allows for both mutual and self capacitance measurements, with the self capacitance measurements being used to augment the mutual capacitance measurements to produce reliable touch information.

Automotive Applications
- AEC-Q100 Qualified
- Developed following Automotive SPICE® Level 3 certified processes
- CISPR 25 compliant (for both mutual and self capacitance measurements)

maXTouch® Adaptive Sensing Touchscreen Technology
- Up to 41 X (transmit) lines and 26 Y (receive) lines for use by touchscreen and keys
- Touchscreen size 10.51 inches (16:10 aspect ratio), assuming a sensor electrode pitch of 5.5 mm. Other sizes are possible with different electrode pitches and appropriate sensor material
- A maximum of 1066 X/Y nodes can be allocated to the touch sensor
- Multiple touch support with up to 16 concurrent touches tracked in real time

Keys
- Up to 16 nodes can be allocated as mutual capacitance sensor keys (subject to other configurations)
- Adjacent Key Suppression (AKS) technology is supported for false key touch prevention

Touch Sensor Technology
- Discrete/out-cell support including glass and PET film-based sensors
- On-cell/touch-on display support including TFT, IPS and OLED
- Synchronization with display refresh timing capability
- Support for standard (for example, Diamond) and proprietary sensor patterns (review of designs by Microchip or a Microchip-qualified touch sensor module partner is recommended)

Front Panel Material
- Works with PET or glass, including curved profiles (configuration and stack-up to be approved by Microchip or a Microchip-qualified touch sensor module partner)
- 10 mm glass (or 5 mm PMMA) with bare finger (dependent on screen size, touch size, configuration and stack-up)
- 6 mm glass (or 3 mm PMMA) with multi-finger 5 mm glove (2.7 mm PMMA equivalent) (dependent on screen size, touch size, configuration and stack-up)

Touch Performance
- Moisture/Water Compensation
  - No false touch with condensation or water drop up to 22 mm diameter
  - One-finger tracking with condensation or water drop up to 22 mm diameter
- Mutual capacitance and self capacitance measurements supported for robust touch detection
- P2P mutual capacitance measurements supported for extra sensitive multi-touch sensing
- Noise suppression technology to combat ambient and power-line noise
  - Up to 240 V\text{PP} between 1 Hz and 1 kHz sinusoidal waveform
  - Up to 20 V\text{PP} between 1 kHz and 1 MHz sinusoidal waveform
- Burst Frequency
  - Flexible and dynamic Tx burst frequency selection to reduce EMC disturbance
  - Configurable Tx waveform shaping to reduce emissions
- Scan Speed
  - Up to 112 Hz report rate for one finger (subject to configuration)
  - Typical report rate for 10 touches ≥85 Hz (subject to configuration)
- Initial touch latency <20 ms for first touch from idle (subject to configuration)
- Configurable to allow for power and speed optimization
- Touch panel failure detection
- Automatic touch sensor diagnostics during run time to support the implementation of safety critical features
- Diagnostics reported using dedicated output pin or by standard Object Protocol messages
- Configurable test limits

**Enhanced Algorithms**
- Lens bending algorithms to remove display noise
- Touch suppression algorithms to remove unintentional large touches, such as palm
- Palm Recovery Algorithm for quick restoration to normal state

**Power Saving**
- Programmable timeout for automatic transition from Active to Idle state
- Pipelined analog sensing detection and digital processing to optimize system power efficiency

**Application Interfaces**
- SPI slave (up to 8 MHz)
- Interrupt to indicate when a message is available
- Additional SPI Debug Interface to read the raw data for tuning and debugging purposes

**Power Supply**
- Digital (Vdd) 3.3 V nominal
- Digital I/O (VddIO) 3.3 V nominal
- Analog (AVdd) 3.3 V nominal
- High voltage internal X line drive (XVdd) 6.6 V with internal voltage pump (XVdd connected to Vdd if voltage pump not used)

**Package**
- 128-lead TQFP 14 × 14 × 1 mm, 0.4 mm pitch

**Operating Temperature**
- mXT1067TD-AT SPI Variant: −40°C to +85°C (Grade 3)
- mXT1067TD-AB SPI Variant: −40°C to +105°C (Grade 2)

**Design Services**
- Review of device configuration, stack-up and sensor patterns
- Custom firmware versions can be considered
- Contact your Microchip representative for more information
PIN CONFIGURATION

Pin Configuration – 128-lead TQFP

mXT1067TD-AT/mXT1067TD-AB SPI Variant

Top view
1.0 PACKAGING INFORMATION

128-Lead Thin Plastic Quad Flatpack (ZA) - 14x14 mm Body [TQFP]
SMSC Legacy VTQE3; Atmel Legacy Global Package Code APL

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-181 Rev C Sheet 1 of 2
128-Lead Thin Plastic Quad Flatpack (ZA) - 14x14 mm Body [TQFP]
SMSC Legacy VTQE3; Atmel Legacy Global Package Code APL

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

<table>
<thead>
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<td>2. Dimensioning and tolerancing per ASME Y14.5M</td>
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<td>BSC: Basic Dimension. Theoretically exact value shown without tolerances.</td>
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<tr>
<td>REF: Reference Dimension, usually without tolerance, for information purposes only.</td>
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Microchip Technology Drawing C04-181 Rev C Sheet 2 of 2
RECOMMENDED LAND PATTERN

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Notes:
1. Dimensioning and tolerancing per ASME Y14.5M
2. BSC: Basic Dimension. Theoretically exact value shown without tolerances.
APPENDIX A:  REVISION HISTORY

Revision A (July 2019)
Initial edition for firmware revision 1.0 – Release
PRODUCT IDENTIFICATION SYSTEM

The table below gives details on the product identification system for maXTouch devices. See "Orderable Part Numbers" below for example part numbers for the mXT1067TD-AT/mXT1067TD-AB SPI Variant.

To order or obtain information, for example on pricing or delivery, refer to the factory or the listed sales office.

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<th>Package</th>
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<tr>
<td>ATMXT1067TD-ABRSPIVAO</td>
<td>1.0.AA</td>
<td>Operating temperature range –40°C to +105°C (Grade 2)</td>
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</table>

Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. See "Orderable Part Numbers" below or check with your Microchip Sales Office for package availability with the Tape and Reel option.
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- Microchip is willing to work with the customer who is concerned about the integrity of their code.
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**Corporate Office**  
2355 West Chandler Blvd.  
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